EXECUTIVE SUMMARY

This report provides information on the characterization of environmental conditions in Washington, DC. It is intended to help decision makers, resource managers, and the public to make prudent, informed choices in shaping our environmental future. This report's subtitle, "A Scientific Foundation for Setting an Environmental Agenda," reflects this concept of examining our current knowledge in order to improve environmental conditions in the future.

In many ways, this report complements the ground-breaking work of "Our Unfair Share: A Survey of Pollution Sources in Our Nation's Capital" by delving deeper into the science to help answer questions about sources of pollution and exposure of the population to contaminants in the air, drinking water, surface waters, and land. This report expands the perspective with more quantitative information on sources of pollution and potential exposures/risks to human health and ecological resources.

If we could first know where we are and whither we are tending, we could better judge what to do, and how to do it.

- Abraham Lincoln

Strong science provides the foundation for credible environmental decision making. With a better understanding of environmental risks to people and ecosystems, EPA can target the hazards that pose the greatest risks.

Expert Panel on the Role of Science at EPA

Finally, the report presents recommendations for potential actions that can be taken as well as suggests further studies to improve knowledge of environmental impacts to residents of the District and the local ecosystem.

Scope of Report

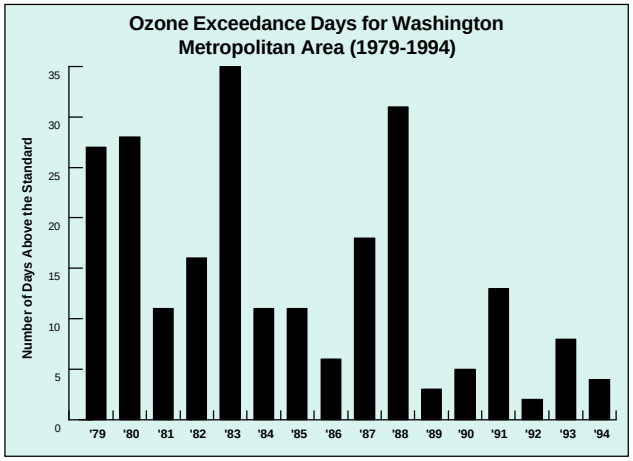
- **DC s Environmental Setting**
- **Sources of Pollution**
- **Human Health Impacts**
- **Health of Ecological Resources**
- **Acknowledgements of Existing Efforts and Recommendations for Further Study and Actions to Improve Environmental Conditions**

The Executive Summary presents a synopsis of information presented in "An Environmental Characterization of the District of Columbia: A Scientific Foundation for Setting an Environmental Agenda." Readers are encouraged to review the full report for detailed descriptions and citations to the original sources of information.

ENVIRONMENTAL SETTING IN DC

It is useful to have a broad perspective of environmental conditions, the "environmental setting," in the District of Columbia. Information and statistics are available on several general indicators of the condition of the environment in DC. These statistics provide some perspectives on factors that may influence environmental condition and related risks to human health and the environment.

In general, DC's air is cleaner than many other major metropolitan areas in the United States, and it has improved over the last few decades. However, DC's main air pollution problem has been ozone (highest in the summer). Although ozone levels vary considerably due to weather conditions, fewer exceedances of the standard have been recorded during the 1990s than in the previous 20 years. Various pollution sources affect air quality in the DC area, most notably, motor vehicles. In the overall region, motor vehicles account for about 28 percent of the total emissions of volatile organic compounds (VOCs) which contribute to ozone. In D.C., as much as 70 percent of the ozone precursors are emitted by motor vehicles. Large industrial facilities, such as power plants, only account for a small portion (about 3 percent) of the emissions that contribute to ozone formation.



A desirable quality of the environment is access to nature and parks. Washington, DC, is predominately an urban area within a larger, semi-developed metropolitan area. DC has 20 percent of its land area as parkland, one of the highest in the Nation. These parklands support wildlife as well as recreational use by residents.

Researchers should investigate specific sources and sites, specific pollutant types, and the specific impacts and effects of pollution on human and environmental health.

Our Unfair Share: A Survey of Pollution Sources in Our Nation s Capital

One overall indicator of environmental condition, the Green Metro index, has been developed by World Resources Institute. This index combines eight measures such as the average air quality, acute air quality, water quality violations, toxic releases, Superfund sites, mass transit use, residential energy use, and gasoline and electricity prices. Based on this index, environmental-related conditions in DC are generally better than in most major cities/metropolitan areas in the United States.

In summary, Washington, DC's environmental conditions are generally favorable; however, there are specific problems to be addressed.

FACTORS INFLUENCING ENVIRONMENTAL CONDITIONS IN DC

Pollutants and other forms of environmental degradation come from a variety of sources, both from within the District and from far beyond its borders. Pollution comes from "point" sources as well as the more elusive "nonpoint" sources such as urban stormwater runoff. While Washington, DC, is not a heavily industrialized city, more than 1,000 facilities are permitted/regulated for releases of pollution into the environment. These facilities include power plants, wastewater treatment plants, drinking water treatment plants, printing operations, Federal Gov-

ernment/military facilities, and many types of small businesses. The types of point sources inventoried include:

- Facilities Discharging to Surface Waters
- Air Emitters
- Hazardous Waste Management Facilities
- CERCLIS Sites
- Facilities Releasing Toxic Chemicals

Comparative ranking of point sources (see below) is intended to provide a screening-level indication of the relative potential for environmental impact from releases from these facilities. In other words, within each environmental medium (e.g., air, water, hazardous wastes), facilities are compared among themselves based on "surrogates for risks," usually the amount and type of chemicals released from each facility.

Why Compare Environmental Risks?

Comparing environmental risks helps to build a scientific foundation for setting environmental priorities.

With limited budgets to address environmental protection, it is critical that priorities be set on the problems that are most serious.

Facilities Discharging to Surface Waters

Thirteen facilities in DC currently have active permits to discharge pollutants into surface waters (Anacostia and Potomac Rivers). These facilities include a publicly-owned treatment works, a drinking water supply facility, electric power generating plants, and others.

Blue Plains Wastewater Treatment Plant, Dalecarlia Treatment Plant, and PEPCO-Benning Road Generating Station are among the facilities with the discharges of greater potential impact, based on examination of total loadings lbs), permit limit excursions, type of pollutants discharged, and toxic-weighted loads. Also, it has been estimated that Blue Plains contributes 95 percent of the nitrogen and 53 percent of the phosphorous loadings from DC to the Potomac River.

Air Emitters

In 1994, 267 facilities in Washington, DC, had air permits/were regulated to emit pollutants into the air. The 11 largest facilities included hospitals, universities, utility companies, heating/cooling systems using boilers, and government printing and publishing operations. Comparison was made among these 11 largest facilities based on the magnitude of emissions and types of pollutants emitted. The remaining facilities were minor facilities such as hotels, dry cleaners, property management companies, parking lots, and government maintenance centers. While emissions from these minor facilities may collectively contribute as much air pollution as the larger facilities, data were not available to characterize the emissions from each.

Comparison of Facilities with Air Emissions

Facility	Comparative Ranking
PEPCO-Buzzard Point	Higher
PEPCO-Benning Road	
Capital Power Plant	
U.S. Government Printing Office	
U.S. Bureau of Engraving & Printing	
St. Elizabeth's Hospital	
U.S. Soldiers' & Airmen's Home	
Howard University	
GSA West Heating Plant	
GSA Central Heating Plant	
Georgetown University	Lower

Hazardous Waste Management Facilities

In DC, 939 facilities were listed as generators/ managers of hazardous wastes. More than 620 tons of hazardous wastes were managed by 15 large quantity generators of hazardous waste. The 15 large facilities were ranked by the total quantity of hazardous waste(s) managed (generated, received, and disposed) by each facility, in descending order, to illustrate the relative potential risk associated with these facilities. These large facilities were likely to have the potential to pose greater risks than individual small quantity generators (SQGs). However, taken collectively, the SQGs generated as much hazardous waste as the 15 larger facilities.

CERCLIS Sites

32 sites in DC were listed in the CERCLIS data base as having some investigation/actions related to hazardous wastes. While no National Priorities List (NPL), or Superfund, sites are in DC, the Washington Navy Yard was recently proposed by EPA to be added to the NPL. In general, the other sites have had limited investigations or remedies of hazardous waste problems and generally have no ongoing activities.

Facilities Releasing Toxic Chemicals

Six facilities in DC reported emissions/releases of toxic chemicals in 1994 under the Toxic Release Inventory (TRI) program. More than 23,000 pounds of toxic chemicals (including copper compounds, chlorine, and glycol ethers) were released to air, water, and land. In general, toxic releases in DC (and the metropolitan area) are among the smallest in the U.S.

Nonpoint Source Pollution to Air and Water

Nonpoint source pollution includes stormwater runoff from farm fields, parking lots, and construction sites as well as emissions to the air from cars and buses. Motor vehicles produce much of the air pollution in DC and the region. Within DC, as much as 70 percent of chemicals that form ozone are attributable to motor vehicle emissions. Ozone is the primary air pollution problem in the DC area and the almost 3 million motor vehicles registered in the metropolitan area are significant contributors of ozone

Hazardous Waste Management in Washington, DC

Facility	Quantity Managed (tons)
PEPCO-Benning Road Generating Station	220.45
U.S. Bureau of Engraving & Printing	134.58
Washington Metro Area Transit Authority	69.01
W M A T A	40.24
Bolling Air Force Base	27.72
Washington Gas & Light Company	23.95
Food and Drug Administration FB 8	21.51
Washington Post Newspaper	19.38
Walter Reed Army Medical Center	17.36
Architect of the Capitol	16.54
U.S. Government Printing Office	15.78
Naval Research Laboratory	14.70
Washington Post Newspaper, S.E. Plant	14.22
Naval District - Washington, DC	2.92
Catholic University of America	2.88
Total	**641.24**

Motor Vehicle Emissions

- **70% of Ozone Precursors Come from Motor Vehicles**
- **Almost 3 Million Motor Vehicles Registered in DC Metro Area**

precursors (volatile organic compounds and nitrogen oxides) and other pollutants such as lead and particulates.

Nonpoint sources of water pollution include stormwater runoff and combined sewer overflow. Stormwater runoff from the streets, parking lots, parks, and other areas is estimated to produce annual loadings to DC's surface waters exceeding 400,000 pounds of zinc, 94,000 pounds of copper, and 22,000 pounds of lead. Nonpoint source runoff is particularly problematic in DC because of the antiquated sewer system. Stormwater runoff, from as much as one-third of DC's area, is drained by a combined sewer overflow (CSO) system. During heavy rainstorms, runoff from streets is combined with sewage, which then flows into the nearest waterbodies. When severe rainstorms exceed the capacity of the system, untreated sewage is released from 60 drains into the city's rivers. The Anacostia River receives 63 percent of the CSO, and the balance is absorbed by Rock Creek and the Potomac River. This CSO runoff may contain bacteria, nitrogen, heavy metals, toxic organic chemicals, petroleum-based oils, and floatable trash and other pollutants that are detrimental to the ecological health of DC's rivers (and indirectly to humans). Bacteria levels in the Anacostia River following rainstorms frequently exceed public health standards.

The Federal Government, which owns a majority of the lands that lie directly along the Potomac and Anacostia Rivers, has made a public commitment to reduce its contribution of pollution by 40 percent or more. Efforts are under way to reduce sources of pollution and excess stormwater, to control or contain contaminants, and to minimize future impacts on the environment in the District.

Last week the CDC and EPA announced that tapwater that is safe enough for healthy individuals could be dangerous for immuno-compromised persons. This echoes what advocates for people with AIDS and others have said for some time...

New York Times, June 2, 1995

Characterizing Human Health Risks

- **Drinking (Tap) Water**
- **Fish Consumption**
- **Ambient Air Quality**
- **Lead**
- **Contaminated Soil**

CHARACTERIZATION OF ENVIRONMENTAL RISKS TO HUMAN HEALTH

Drinking water, fish consumption, ambient air quality, lead, and contaminated soil are considered to be among the most apparent means by which people can be exposed to pollutants. Many of these topics have been addressed in the local press because they are of concern to DC residents. This report characterized the potential risks for these major sources/issues of concern with respect to the levels of pollutants in the environment, opportunities for exposure, and re-

DC's Drinking Water System

sulting health effects (especially to susceptible subpopulations such as asthmatics, children, etc.).

Drinking Water

The District's drinking water continues to be of concern, especially following several "boil water" advisories over the last few years. These advisories have been issued because of concerns over disease-causing bacteria/pathogens (*such as Crytosporidium*) in drinking water. Despite these problems, the drinking water in DC meets regulatory standards and is generally safe for use by most of the population. However, individuals who have weakened immune systems should take precautions (consult their physicians and/or boil the water) with respect to use of drinking water. Concern also results from chemical contaminants such as metals (especially lead) and trihalomethanes (THMs) that may be present in drinking water at levels that could impact human health. Positive signs for the future include improvements in the operation of drinking water treatment plants/distribution systems serving DC, as well as new regulations from EPA requiring increased monitoring for *Crytosporidium* (and other disease-causing contaminants) in drinking water.

Fish Consumption

Contaminated fish and shell fish are potential sources of human exposure to toxic chemicals. DC currently has public health fishing advisories in effect for the consumption of channel catfish, eel, and carp because of elevated levels of PCBs and chlordane detected in fish caught in DC stretches of the Potomac and Anacostia Rivers. Unfortunately, the fish advisory does not appear to be effective in reducing consumption of these species. According to survey results, shoreline anglers target their catch (prefer) to species such as catfish, eel, and carp, the species to which the fishing advisories apply. Of the anglers surveyed, 78 percent were not aware of a fish advisory.

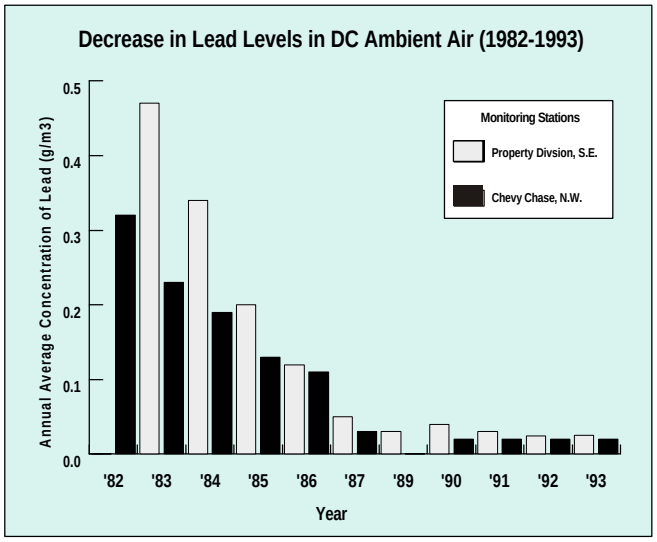
Shoreline recreational and subsistence anglers are the populations believed to be at highest risk. Subsistence anglers may be obtaining a large portion of their diet from fish. Although these anglers may represent a small fraction of the total population, they may be representative of the majority of risks posed by consumption of fish from contaminated surface waters. Unfortunately, the fish species upon which they depend may have higher levels of contaminants.

Concerns for Fish Consumption

- **Toxic Chemicals - PCBs and Pesticides**
- **Higher Levels in Catfish, Eel, Carp**
- **Fish Adivsory in DC Waters**
- **Advisory is not Effective**
- **Recreational and Subsistance**
- **Fishermen May be at Higher Risk**

Ambient Air Quality

The air quality in the District is generally good, with some improvement shown during the last few decades. The lack of heavy industry in the DC area partially accounts for the relatively clean air; however, automobile emissions are major contributors to the region's ozone problems. Most of the air quality alerts in the area are caused by high ozone levels during the summer. Persons most at risk for health effects are those with pulmonary (lung) diseases, such as asthma or emphysema. During an air quality alert, people at risk should remain indoors as much as possible,



preferably in an air-conditioned environment. Everyone, regardless of their health status, should avoid heavy exertion from running, bicycling, lawn mowing, and similar activities. In general, levels of pollutants have decreased over time, especially lead; lead levels have dropped dramatically (90 percent) since the phase-out of leaded gasoline. Ozone levels also show improvement with fewer days during which levels exceed the national standard (0.120 ppm).

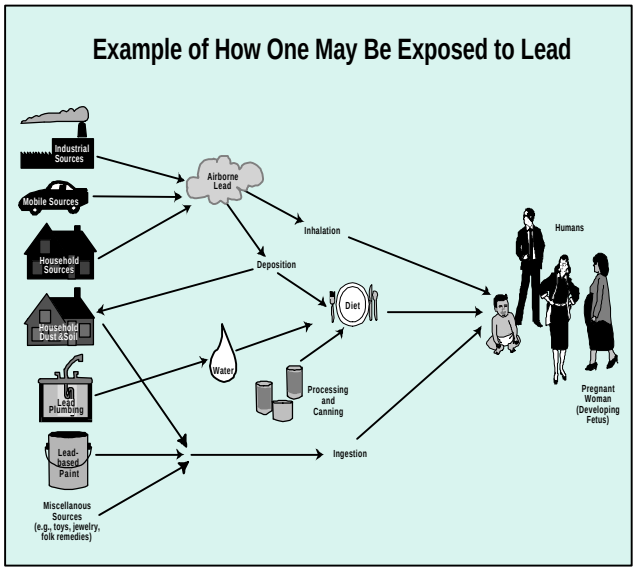
Indoor Air Pollution

While the ambient (outdoor) air quality in DC is good, limited information about indoor air quality raises concerns about potential impacts to human health. Indoor air pollutants include tobacco smoke, carbon monoxide, bacteria, radon, formaldehyde, and many others. Levels of pollutants can be higher in indoor environments than in ambient air. Because most people spend 90 percent of their time indoors (homes, offices, etc.), it is evident that indoor air pollution has the potential to be a major impact on human health. However, only limited data exist on levels of air pollutants (carbon monoxide) in indoor environments in the DC area.

Lead Exposure

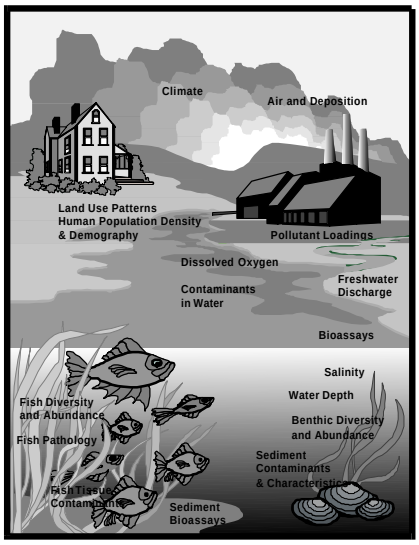
Sources of lead exposure for the general population include paint, gasoline, and soldered cans. Lead has also been found in other media such as soil and dust. Additionally, drinking water is a source of lead exposure. Lead has been used in service lines; solder for the pipes, fixtures, and fittings. Information indicates that DC still has some lead in service lines. The intentional ingestion of soil called "pica" is another source of lead exposure (especially for children).

Blood lead levels for inner-city (DC) children are higher than levels for the suburban and rural children. More than 18 percent of the 4,196 inner-city children studied had levels greater than10 μg/dL, which is the CDC's acceptable level. Therefore, about 82 percent of the subjects from DC were within the CDC's acceptable range for blood lead levels.



HEALTH OF ECOLOGICAL RESOURCES IN DC

The ecological resources in the District have been degraded from decades of human-induced stress. Fisheries have been greatly reduced from historical levels and may never attain their original abundance. Other aquatic resources are in fair-to-poor condition because of degraded water quality and loss of habitat. While many of the Anacostia Rivers' problems can be attributed to non-point sources, the Washington Navy Yard is a source of toxic runoff and has been proposed as a Superfund Site. In addition to the poor water quality (sedimentation, bacteria, nutrient-enrichment, and low dissolved oxygen) in the Anacostia, trash and debris are evident on the shores of the river. An important aspect of the restoration of the Anacostia River will be controlling combined sewer overflow (CSO) and nonpoint source runoff.

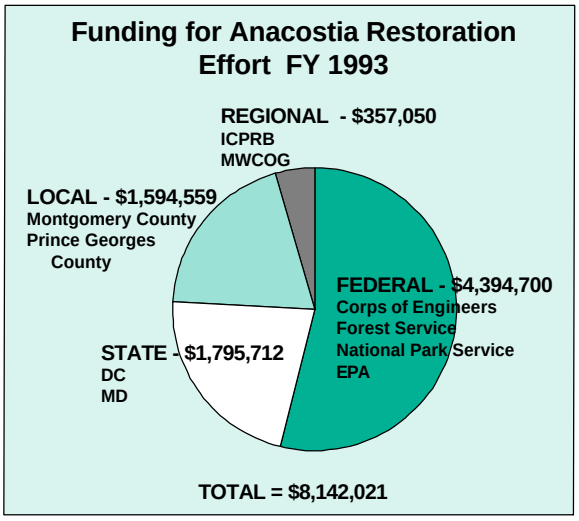


Restoration activities for the Anacostia River are underway, with coordination among Federal agencies,

military establishments, State agencies, DC government, and other regional organizations. These efforts coordinate more than $8 million annually in activities to improve water quality and promote the health of ecological resources in the Anacostia. Some of the benefits are already evident; water quality is improving and submerged aquatic vegetation (SAV) is beginning to return. SAV provides food and cover for fish, shellfish, and waterfowl, and improves water quality by reducing sediment and nutrients, and producing oxygen. Although the species of aquatic vegetation that are growing are not the same as the original (native) species, their presence is indicative of improved water quality.

The U.S. Army Corps of Engineers already has restored 32 acres of wetlands at the Kenilworth Marsh and plans to restore an additional 75 acres on the Anacostia River. The completion of these restoration efforts will double the total amount of emergent tidal wetlands in the District (from 100 to 200 acres).

The continued protection of Rock Creek Park as an aquatic and terrestrial corridor for migrating species has provided important benefits to the regional ecosystem. The value of the Rock Creek corridor would not be realized without the coordinated efforts of the Maryland-National Capital Park and Planning Commission and adjacent Montgomery County, Maryland.



RECOMMENDATIONS FOR RISK REDUCTION AND ACKNOWLEDGEMENTS OF EXISTING EFFORTS

Although it appears that environmental conditions in DC are generally favorable, specific recommendations are provided to facilitate risk reduction. In particular, there is a need to better communicate the idea of environmental risk to those persons whose health conditions, activity patterns, and lifestyles may result in potentially higher risks. In particular, potential risks from fish consumption, air pollution (including indoor air), lead paint, and drinking water need to be communicated to those who may be more susceptible. Improved communication is intended to result in steps that can be taken to reduce the risks for those subpopulations (e.g., reduce fish consumption, boil drinking water).

Other recommendations relate to advocating continuing existing efforts as well as integrating new activities that can be undertaken/continued by government agencies to improve environmental conditions with respect to both human health and ecological resources:

- Continue to upgrade drinking water treatment/distribution systems, taking into account the recommendations of many groups;
- Continue/expand tapwater monitoring throughout DC;
- Monitor blood lead levels (especially in children) to better identify possible poisonings from lead-based paints in houses;
- Improve communication of fish advisories to recreational and subsistence fishermen;
- Implement an ozone mapping and communication system to better warn individuals of high ozone levels and to suggest decreasing outdoor activities during these periods;
- Continue to upgrade the Blue Plains Treatment Plant to reduce inputs of nutrients into the Potomac River;

- Create an infrastructure to coordinate studies of human health risks in the DC area. Similar to groups that coordinate ecological monitoring/restoration in the area, DC might benefit from a coordinated effort of the Federal, State, local, regional, and private organizations with responsibilities for human health;

- Continue the coordinated efforts to restore the Anacostia River and its watershed. Some initial signs of the benefits of such efforts are becoming apparent; and

- Continue efforts to reduce nonpoint source pollution (combined sewer overflows, sedimentation, and nutrient enrichment) to the District's surface waters.